

**NEBRASKA DEPARTMENT OF ROADS  
NDR STANDARD METHOD T 506**

**DETERMINATION OF THE FREE  
MOISTURE CONTENT OF AGGREGATE**

**SCOPE**

- 1.1 This method covers a procedure for determining the free moisture content (*surface moisture*) of an aggregate. The free moisture content of aggregates, as determined by this method, is the value necessary for the determination of the batch weight of aggregate proportioned in portland cement concrete.

**NOTE:** *This method of test is not intended for use with lightweight aggregates or aggregates of highly porous or highly absorptive character.*

**APPARATUS**

- 2.1 **Balance** - A balance sensitive throughout the operating range to 1.0 gram or less.
- 2.2 **Sample Container** - A metal can or other suitable container of sufficient volume to contain the sample without damage of spilling. A container with a rounded bottom and devoid of cavities or indentations on the outer surface is preferred, in that this type of container is less likely to entrap air when immersed in water. (See *diagram*.)
- 2.3 **A Suitable Container** - For immersing the sample container in water and suitable apparatus for suspending the sample container from center of scale pan of balance.
- 2.4 The apparatus described above, when assembled for this method test is commonly referred to as the "Dunagan Apparatus". A typical setup is illustrated in the accompanying diagram.

**SAMPLE**

- 3.1 Secure a sample of the aggregate representative of the moisture content in the supply being tested and weighing not less than the amount listed in the table below.

**SAMPLE SIZE**

<b>Nominal Size, max<sup>a</sup> (sieves with square openings)</b>	<b>Weight of Sample Minimum, kg.</b>
<b>In.</b>	<b>mm</b>
3/8 or less	9.5
1/2	12.5
3/4	19.0
1	25.0
1 1/2	37.5
2	50

<sup>a</sup> Size of largest sieve upon which less than 10 percent will be retained.

## PROCEDURE

- 4.1 Weight the sample to the nearest gram. Loss of moisture from the sample prior to obtaining this weight determination should be avoided to the extent possible.
- 4.2 After weighing, place the sample in the sample container. A sufficient quantity of water to cover the sample shall be placed in the container prior to adding the sample. Stir the aggregate as it is placed in the sample container to remove entrapped air.
- 4.3 The sample should stand for a moment in the sample container to allow most of the suspended fines to settle. Immerse the sample container and sample in the larger container, taking care to avoid entrapping air beneath the sample container. Determine the sample weight, in water, to the nearest gram.

## CALCULATION

- 5.1 The percentage of free moisture shall be calculated from the following formula:

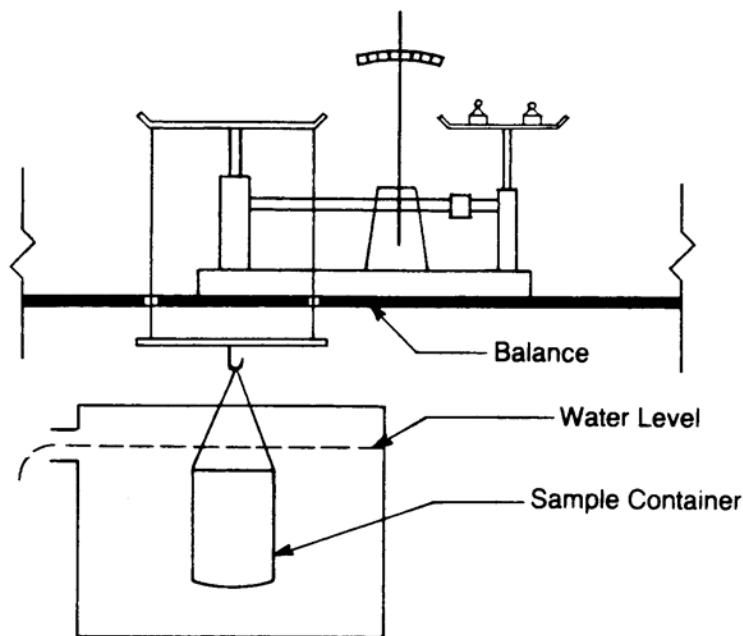
$$\text{Free Moisture, percent} = 100 \left[ \left( \frac{W}{W_1} \right) \left( \frac{G-1}{G} \right) - 1 \right]$$

where:

$W$  = Weight of aggregate in air,

$W_1$  = Weight of aggregate in water, and

$G$  = Saturated Surface-Dry Specific Gravity of the Aggregate



Dunagan Apparatus